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Research Article

New Record of the Genus *Porphyridium purpureum* from Kurdistan

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Abstract: The present work deals with the rare species and seldom in occurrence and distribution. It is terrestrial, freshwater unicellular red algae *Porphyridium purpureum* (Bory de Saint-Vincent) Drew, K.M. & Ross, R. (1965). Species and ecological information of the area are given in context. This genus is a new record to Kurdistan. This algae was observed and collected from Gali-Ali Beg Valley mountain area on rocks within Erbil province, Iraqi Kurdistan region, on several occasions from the moist shaded area on rocks during the spring season. Information's on taxonomic status, morphological characteristic with reproduction features and habitats of this species as a new record to Kurdistan were reported.

Keywords: *Porphyridium purpureum*, Red Algae, Iraqi Kurdistan, New Record.

1. Introduction

This genus is a member of the division Rhodophyta, it has many economical applications for the production of pigments, fatty acids, lipids and polysaccharides produced by Golgi bodies (Lee, 2005; Wang *et al.*, 2007). Also, the algae are used in genetic, physiological and biochemical studies (Barsanti and Gualtieri, 2006). It is cosmopolitan in their distribution in moist, shaded area and in eutrophic conditions as epipelic and epilithic algae on rocks (Lee, 2005; Gaikwad *et al.*, 2009).

There are some communications in growth, economical and medical importance of this genus (Csogor *et al.*, 2001) in Netherland, and the effect of some environmental factors on its chemical composition (Nuutila *et al.*, 1997) in Germany. However, modeling of growth simulation and product formation of this genus was made by (Fleck-Schneider *et al.*, 2007) in Germany too.

This is only one of the unicellular red algae that are singly terrestrial (Smith, 1950 and Prescott, 1975), and this genus recorded in the USA, Texas, and India (Gaikwad, 2009) and reported in Iraq (Hinton and Moulood, 1983). The present work on the genus *Porphyridium purpureum* is the first report on their occurrence in Kurdistan.

2. Description of the area

The specimen was collected during a scientific excursion in 12th April 2011 in a shady damp area on calcareous rocks in the mountainous, deep valley on concrete walls that surrounding a spring as a terrestrial habitat. This place situated near the confluence point of the Rawanduz tributary with Khalifan tributary on the main old road inside Gali-Ali Beg Valley (Fig. 1) within Erbil province the capital of Kurdistan region, Iraq (Fig. 2).

3. Sample collection and identification

The sample was collected from different locations on damp soil on moist rocks in the shaded area within Gali-Ali Beg valley. The specimen was preserved in Lugol's solution. The Identification was made by using a digital camera connected to Olympus microscope, while the preliminary picture was taken by digital camera from the field and re-drawled by hand from the laboratory. The identification was made by using mentioned references below.

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Fig. (1). The place of sample collection within Gali-Ali Beg valley, Erbil, Iraq (Mentioned in the description of the area).

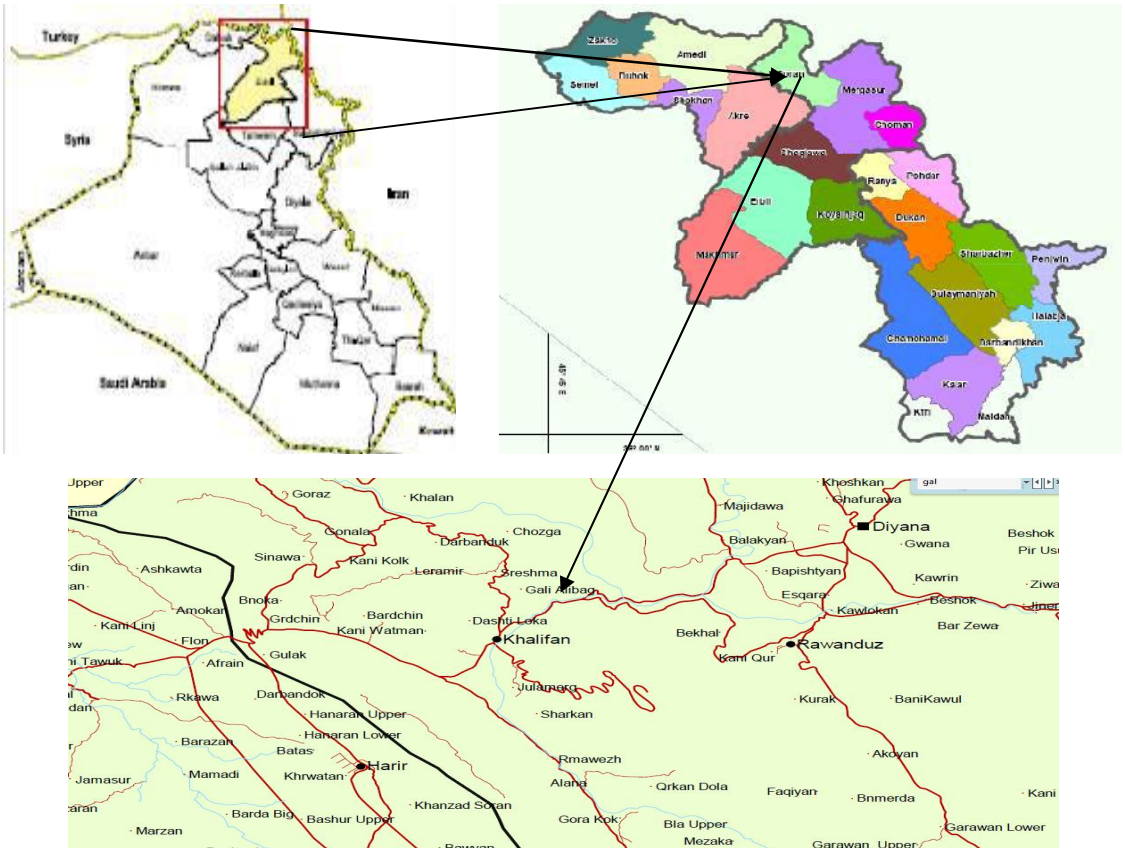

Fig. (1). Map of Iraq, Iraqi Kurdistan Region and Erbil province showing the position of sample collection. A: Iraq, B: Iraqi Kurdistan, C: Gali.

4. Description of the genus

The genus *Porphyridium Nageli* is fully described by Nageli, 1849 and Gaikwad *et al.*, 2009. However, this species *P. purpureum* described at cellular organization by (Bold and Wynne, 1985). The cells are embedded in mucilaginous sheath, forming irregular or spherical colonies producing aggregate masses look like a spot of blood on the soil. The cell is spherical or globular in shape with light blood-red chromatophore forming blood colour red film on damp soil and moist rocks with exocentric nucleus and a single central pyrenoid. Both the colony and individual cells are surrounded by their own sheath. Reproduction occurs by cell division. The size of cell is variable 5-15-25µm in diameter, in our specimen the size of a cell was 15µ (Fig. a,b,c, and d).

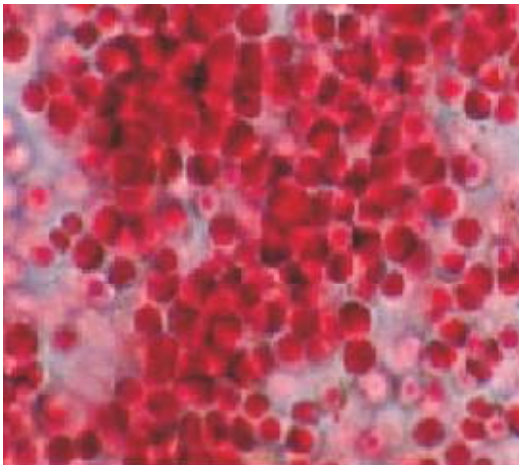

Fig. a. *Porphyridium purpureum* Photo took by 10 Megapixels digital camera from the field.

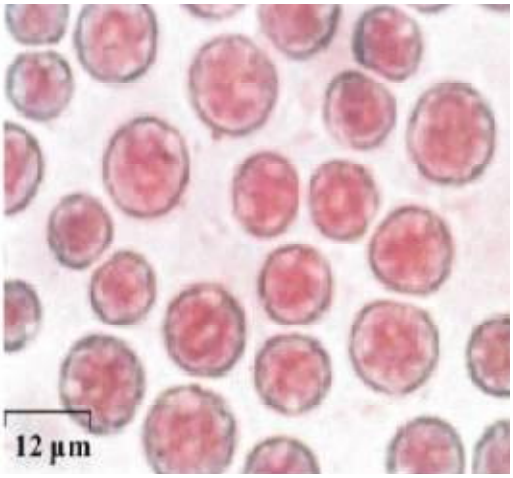

Fig. b. Photo of *Porphyridium purpureum* from microscope at 400X.

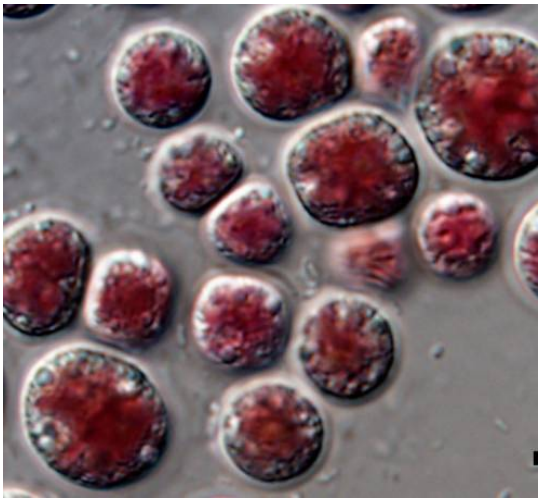

Fig. c. Preliminary photo of *Porphyridium purporeum.*

Fig. d. Modified from Bold and Wynne, 1985.

The genus was first described by Nageli, 1849. The plant profile is as follows:

Kingdom: Plantae
Division: Rhodophyta
Class: Rhodophyceae
Subclass: Bangiophyceae
Order: Porphyridiales
Family: Porphyridiaceae
Genus: *Porphyridium*
Species: *Porphyridium purpureum* (Bory de Saint-Vincent), Drew and Ross, 1965; Bold and Wynne, 1985.

5. Discussion

In Kurdistan previously 4 species of filamentous red algae recorded, including *Bangia atropurpurea, Compsopogon coeruleus, Audouinella violence and Batrachospermum moniliforme* (Aziz, 1997). The genus *Porphyridium purpureum* is the fifth species, which are unicellular red algae.

To date, 5 species of *Porphyridium* (Bory de Saint-Vincent) Drew and Ross (1965) have been recognized; *P. purpureum*, *P. aerugineum* Geitler, *P. sordidum* Geitler, *P. violaceum* Kornmann and *P. griseum* Geitler.

According to the review of Gaikwad *et al*., (2009), these species could be distinguished from each other by visual colour of plastids. However, dimension and the position of pyrenoid may have a little role in identification. For this species, the light, blood-red colour is the major identification key and for genus, the red colour is on the rocks and the soil surface is a single key for unicellular red algal identification and recognition.

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